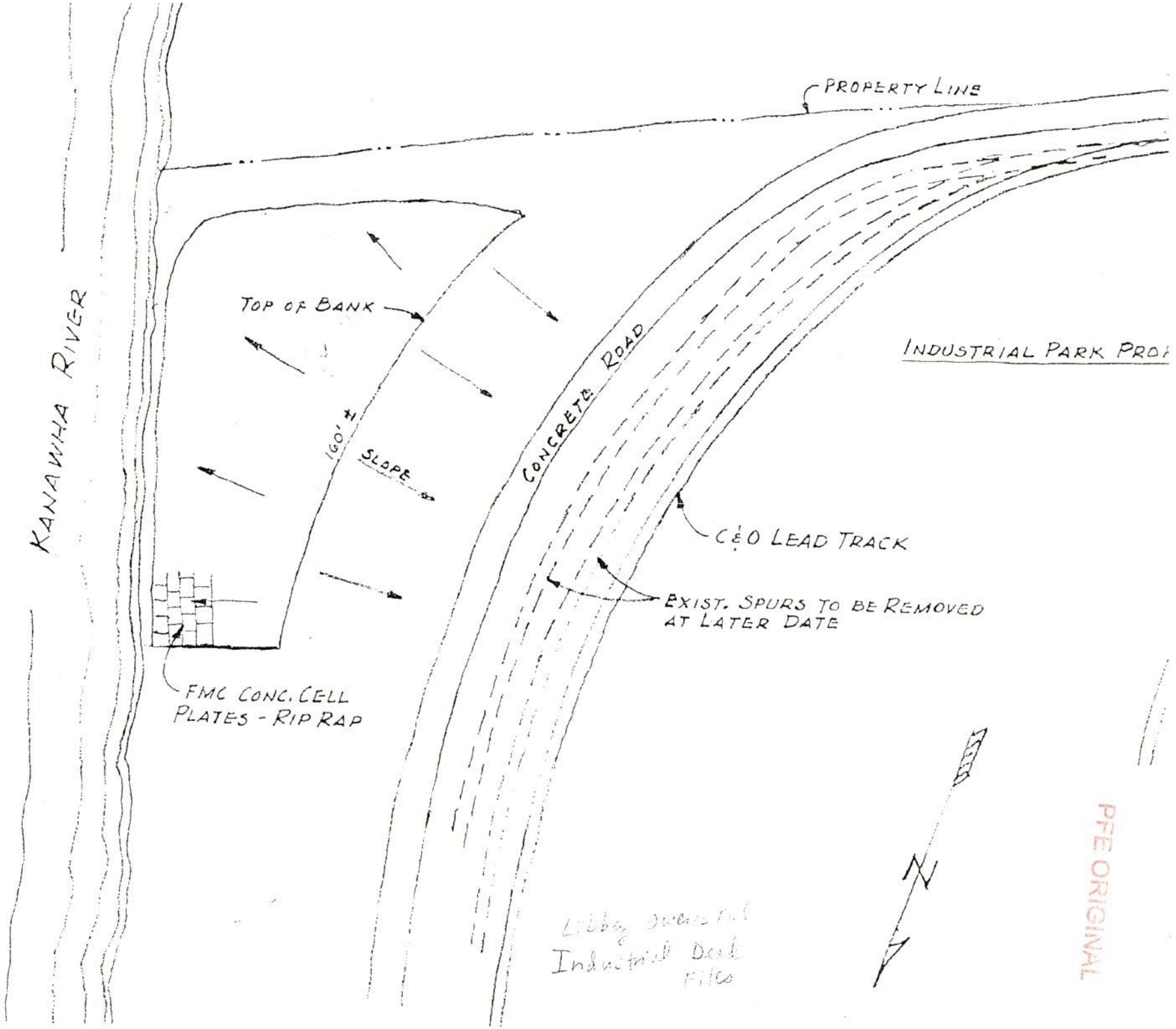
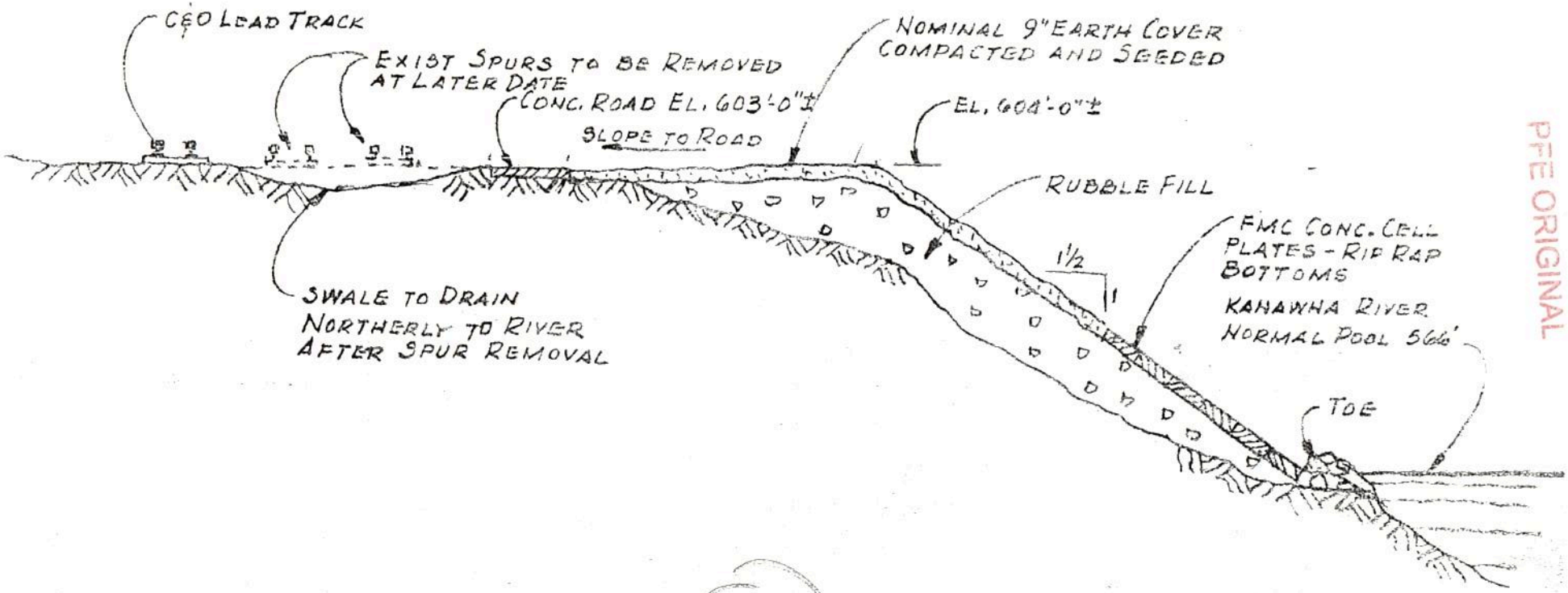

PROPERTY LINE
KANAWHA RIVER
TOP OF BANK
160' ±
SLOPE
CONCRETE ROAD
INDUSTRIAL PARK PROJ
C & O LEAD TRACK
EXIST. SPURS TO BE REMOVED AT LATER DATE
FMC CONC. CELL PLATES - RIP RAP
N
Libby Owens Ford Industrial Dept. Files
PFE ORIGINAL

7/27/73



L.O.F. River Bank Reclamation Project

Typical Section

7-25-73

LOF Glass
Libbey-Owens-Ford Company

April 4, 1983

Ms. Pamela D. Hayes, Geologist
Hazardous Waste/Ground Water Branch
Division of Water Resources
West Virginia Department
of Natural Resources
1201 Greenbrier Street
Charleston, WV 25311

Subject: LOF Disposal Practices

Dear Ms. Hayes:

We apologize for the delay in replying to your inquiry of February 10, 1983. Since the LOF Charleston facility has been closed since 1980, it took some time to review its environmental records to insure accurate responses to your questions. The broad time frame involved with disposal practices greatly predates the public's concern over techniques and the information in our files is somewhat vague nevertheless, tried to make our responses as complete as possible.

If further information is needed, please advise.

Very truly yours,

Thomas J. Koralewski

Thomas J. Koralewski
Senior Environmental Engineer

TJK:rmb

1701 East Broadway Toledo, Ohio 43605 Telephone 419 247-3731 TWX 810-442-1739 Telex 28-6437

1) A brief description of waste disposal practices at the site, including the manner of placement, containerization, covering, etc.

Refuse, garbage, and combustible materials were hauled off-site for landfill disposal. Fill materials, consisting mainly of used furnace refractories, unusable glass batch materials, and broken glass (cullet) were landfilled on the plant site. There was no containerization or covering of the waste at the plant site.

2) A description of the waste, the source of the waste, and the amount.

The waste consisted mostly of used refractories, unusable glass batches, and cullet (broken glass).

a) Used refractory may have contained oxides of silicon, sodium, magnesium, calcium, chromium, manganese, et al. It originated from rebuilding the glass furnaces at the site.

b) Unusable glass batches may have contained sand, soda ash, aplite, limestone and dolomitic limestone, rouge, arsenic, salt cake and carbon. This waste came from off-weight and poor quality materials, and from dust collectors.

c) Cullet is broken glass and consists of oxides of silicon, sodium, calcium and magnesium with trace constituents. This cullet became a waste because of contamination that made its remelting into quality glass impossible.

The amounts of each waste disposed of at the plant site are unknown.

3) A site map showing areas where wastes were placed and the size of areas where wastes were placed.

An LOF drawing (1-G4) of the Charleston plant site is enclosed; general areas that were used as disposal sites are marked in red. The exact sizes of the areas are unknown.

4) Provide a written site description including history of conditions at site, nearby streams, wells, residences and any other pertinent information.

The Kanawha River flows near the plant, approximately 500 feet east of the site of the glass furnaces. There was a drainage ditch west of the property near the C&O Railroad line. (See drawing) There were no wells on the property; we believe that potable water for the plant and for nearby residences came from the city water supply.

5) The period of use (dates that waste disposal began and ended on the site).

The Libbey-Owens Glass Company started glass production in 1917, and ceased operation in 1980. We believe that landfill disposal was common at the plant site during this time frame.

6) Any off-site areas where wastes may have been placed.

When the glass furnaces were rebuilt, it was common practice to allow individuals to take the used furnace refractory (and debris) to use as fill material. No records were kept of material removed in this manner. Our engineering records do indicate the following areas received waste materials:

a) St. Agnes Catholic Church in Kanawha City.
b) City landfill at South Park Road.
c) Dr. Cavender's property at 29th Street, S.W. and South Ruffner.
d) Mr. Anderson's property at 5222 Kanawha Avenue, S.E.
e) Above Turnpike Bridge in Kanawha City.
f) Mr. Slack's property on Mill Creek Road near Route 14.
g) Mr. Lockard's property in Loudendale.
h) Mrs. Faircloth's property at 6536-6538 Roosevelt Avenue, S.E.
i) Mr. Johnson's property in Land Creek adjacent to Route 119.

In addition, waste material was disposed of in Owens (Industrial) Park, located across McCorkle Avenue from the plant site; this area has been shown on the drawing enclosed.

7) A list of applicable permits that were held by the site, i.e., state, air, NPDES, etc.

The facility did not hold any permits.

8) Analyses of wastes and any monitoring or sampling data available concerning areas where wastes were placed and discharges from these areas.

Following are two tables which present data that was obtained from waste analyses at the site. Some explanations are necessary to interpret the data:

Samples 7 thru 20 were surface water samples obtained from an area where refractory debris and bad batch materials were discarded. In 1973, this area was capped using Bentonite, per the instructions of the West Virginia Department of Natural Resources.

Samples 24 thru 29 were surface water samples obtained from a concrete pad area where bad batch materials were segregated before disposal (by deep well injection). Samples 30 thru 32 were from the same area from drainage tile and show that there was little or no seepage of surface water into the tile.

Samples 33 thru 37 were taken to verify that bad batch materials were not hazardous waste.

Samples 38 thru 57 were obtained to determine if used refractories were a hazardous waste. The conclusion drawn from the analyses was that the refractories were not hazardous, when the total volume of refractories was considered a unit for disposal.

No.	Date	Sample	SiO_2	Fe_2O_3	Al_2O_3	Cr_2O_3	CaO	MgO	Na_2O	SO_3	As_2O_5	Total Dissolved Solids	Total Phosphorus	Total Organic Carbon	pH
1	7/55	Flue deposits.	1.66%	-	-	-	18.68%	12.92%	3.83%	41.64%	14.78%	-	-	-	-
2	10/28/55	Flue deposits.	1.42%	-	-	-	15.88%	11.60%	8.46%	36.88%	10.78%	-	-	-	-
3	3/ 7/57	Flue deposits.	5.52%	7.91%	11.92%	1.01%	1.52%	71.90%	0.05%	0.10%	Trace	-	-	-	-
4	3/ 7/57	Flue deposits.	5.08%	1.37%	0.44%	0.53%	16.95%	9.11%	8.78%	37.64%	17.63	-	-	-	-
5	3/ 7/57	Flue deposits.	2.54%	1.07%	0.24%	0.57%	12.34%	9.07%	18.40%	38.18%	15.51%	-	-	-	-
6	3/ 7/57	Flue deposits.	3.44%	2.61%	1.31%	0.78%	8.24%	7.24%	25.32%	41.30%	8.50%	-	-	-	-
7	7/12/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	270mg/l	-	-	-	-
8	7/12/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	44mg/l	-	-	-	-
9	7/12/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	310mg/l	-	-	-	-
10	7/13/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	220mg/l	-	-	-	-
11	7/13/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	220mg/l	-	-	-	-
12	7/14/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	284mg/l	-	-	-	-
13	7/14/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	261mg/l	-	-	-	-
14	7/15/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	220mg/l	-	-	-	-
15	7/15/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	196mg/l	-	-	-	-
16	7/15/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	19.7mg/l	-	-	-	-
17	7/16/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	260mg/l	-	-	-	-
18	7/16/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	191mg/l	-	-	-	-
19	7/16/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	34.4mg/l	-	-	-	-
20	7/16/73	Puddle near batch dump area.	-	-	-	-	-	-	-	-	70mg/l	-	-	-	-
21	7/16/73	Puddle near cullet bins.	-	-	-	-	-	-	-	-	0.23mg/l	-	-	-	-
22	8/21/73	Flue deposits.	-	-	-	-	-	-	-	-	4.16%	-	-	-	-
23	8/22/73	Refractory deposit.	-	-	-	-	-	-	-	-	6.00%	-	-	-	-
24	4/ 5/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	73.5mg/l	34,840mg/l	30.8 mg/l	255mg/l	10.6
25	4/ 5/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	49.0mg/l	54,650mg/l	15.3 mg/l	580mg/l	10.7
26	4/ 5/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	131mg/l	53,610mg/l	30.5 mg/l	40mg/l	10.6
27	4/ 6/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	61.0mg/l	24,790mg/l	31.5 mg/l	50mg/l	10.3
28	4/ 6/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	10.3mg/l	4,763mg/l	5.88mg/l	34mg/l	10.4
29	4/ 6/76	Puddle near batch dump area.	-	-	-	-	-	-	-	-	43.6mg/l	12,020mg/l	7.38mg/l	85mg/l	10.4
30	4/ 6/76	Drainage tile near batch dump area.	-	-	-	-	-	-	-	-	0.72mg/l	324mg/l	1.63mg/l	32mg/l	7.0
31	4/ 6/76	Drainage tile near batch dump area.	-	-	-	-	-	-	-	-	0.17mg/l	91mg/l	0.23mg/l	3mg/l	7.3
32	4/ 6/76	Drainage tile near batch dump area.	-	-	-	-	-	-	-	-	1.51mg/l	336mg/l	1.04mg/l	12mg/l	7.5

T.J.KORALEWSKI:rmb
April 4, 1983

E.P. TOXICITY TESTS

No.	Date	Sample	Cr	As
33	9/ 4/79	Bad batch samples.	-	0.05mg/l
34	9/ 4/79	Bad batch samples.	-	0.12mg/l
35	10/12/79	Bad batch samples.	-	0.01mg/l
36	10/12/79	Bad batch samples.	-	0.39mg/l
37	10/12/79	Bad batch samples.	-	2.30mg/l
38	10/ 8/80	Refractory deposit.	10.4 mg/l	0.08mg/l
39	10/ 8/80	Flue deposit.	1.12mg/l	22.2 mg/l
40	11/ 3/80	Refractory deposit.	30.8 mg/l	-
41	11/ 3/80	Refractory deposit.	111mg/l	-
42	11/ 3/80	Refractory deposit.	0.02mg/l	-
43	12/ 9/80	Refractory deposit.	<0.01mg/l	-
44	12/ 9/80	Refractory deposit.	0.24mg/l	-
45	12/ 9/80	Refractory deposit.	<0.01mg/l	-
46	12/ 9/80	Refractory deposit.	23mg/l	-
47	12/ 9/80	Refractory deposit.	0.10mg/l	-
48	12/17/80	Refractory deposit.	98mg/l	-
49	1/14/81	Refractory deposit.	0.24mg/l	-
50	1/14/81	Refractory deposit.	0.12mg/l	-
51	1/14/81	Refractory deposit.	3.0 mg/l	-
52	1/14/81	Refractory deposit.	0.10mg/l	-
53	1/14/81	Refractory deposit.	0.59mg/l	-
54	1/14/81	Refractory deposit.	6.1 mg/l	-
55	1/26/81	Refractory deposit.	1.13mg/l	-
56	1/26/81	Refractory deposit.	16.5 mg/l	-
57	1/26/81	Refractory deposit.	0.10mg/l	-

DAVIES, THOMAS, TIONG

RECORD OF CHEMICAL ANALYSES

K--4010

Location: L.O.F. Glass Co

INDUSTRIAL WASTE SECTION
DIVISION OF WATER RESOURCES

Analyses in mg/l unless otherwise noted.

Sampling Point	Date Col.	pH Units	Arsenic mg/kg						
1 *	7-16-73	9.8	7000						
2 *	"	10.5	45						
		F2	F2						

Sampling Point	Date Col.								

Sampling Point	Date Col.								

* Sample solid - 100 g made up to 1 l w/ D.W. - Resulting liquid used for testing!

K-2810

DIVISION OF WATER RESOURCES
Sampler's Report Form

DATE: July 16, 1973 TOWN:
COMPANY: L. O. F.
OTHER:
LOCATION: Kanawha City
WEATHER: Clear PLANT DESIGNATION:
STREAM: Kanawha
BASIN: Kanawha

Sample Point No.	Sample Point Description	Bottle No. BOD	DO	Coli.	Time	Temp.	Routine	OTHER ANALYSES DESIRED
#1	Sample of dust from Collector							As. pH
#2	Sample of material in							
	Dump on River Bank							Al. pH

ROUTINES:

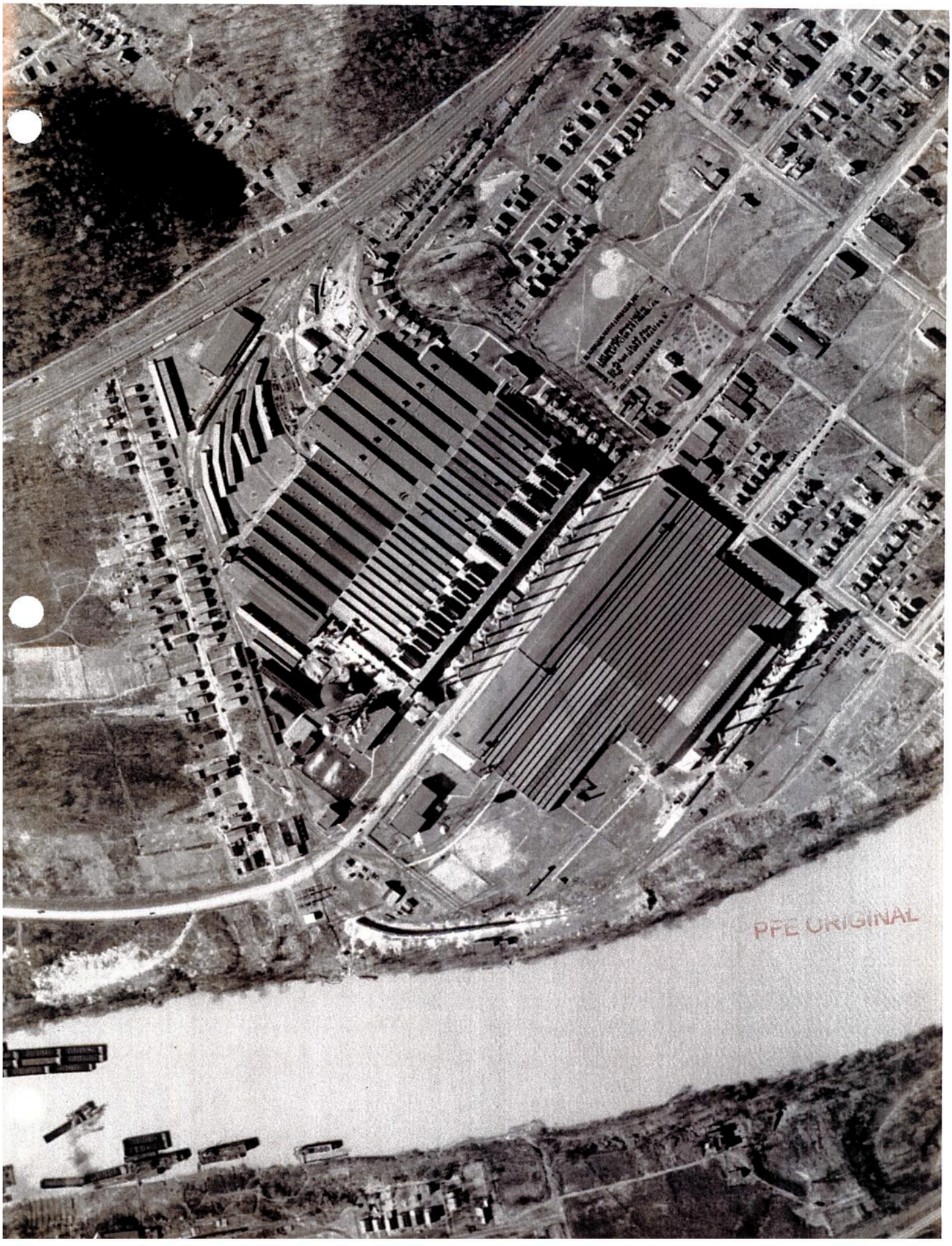
1. COAL
   pH
   Solids (T.S. & D.)
   Appearance
   Turbidity

2. MINE DRAINAGE
   pH
   Acidity (Total & Mineral)
   Alkalinity (Phth & M.O.)
   Total Iron
   Total Aluminum
   Total Sulfates

3. MUNICIPAL
   pH
   Alkalinity (Phth & M.O.)
   Solids (T.S. & D.)
   Hardness
   Chlorides
   Coliform

SAMPLER: Martin Tobe

Received 7-16-73 @ 4:35 PM by WJ


PFE ORIGINAL